

FORMER STABLE, 84 WOODHEAD
ROAD, HINCHLIFFE MILL, HD9 2NL

Acoustic Planning Report
Condition 10

Document History

Project Document Reference: 1700689-RP-NIA-001

Rev	Date	Comment	Author	Checked
1	19 November 2021	Final Issue	AJH	GH

Contents

1.	INTRODUCTION	1
1.1	Consultation	1
1.2	Scope.....	1
2.	SITE DESCRIPTION.....	2
2.1	Site Location & Environment.....	2
2.2	Approved Development	3
3.	PLANNING POLICY GUIDANCE.....	5
3.1	Introduction.....	5
3.2	National Planning Policy Framework (NPPF) July 2021	5
3.3	Noise Policy Statement for England (NPSE, March 2010).....	6
3.4	Planning Practice Guidance - Noise	7
3.5	West Yorkshire Planning Consultation Guidance (condensed Version) – Noise & Vibration” - May 2016	9
3.6	BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’	9
3.7	BS 7445-2:1991 ‘Description and Measurement of Environmental Noise’	10
4.	Planning Conditions	11
5.	ENVIRONMENTAL NOISE SURVEY	12
5.1	Overview	12
5.2	Noise measurement Equipment	12
5.3	Weather Conditions.....	12
5.4	Noise Measurement Location	13
5.5	Measurement Results	13
5.6	Data Analysis	14
6.	NOISE IMPACT ASSESSMENT	15
6.1	Overview	15
6.2	Impact Assessment.....	15
6.3	Mitigation.....	16
6.4	Internal noise impact	16

7. CONCLUSIONS	18
7.1 Summary of findings	18
 APPENDICES.....	 19
Appendix A – Glossary of Acoustic Terminology.....	20
Appendix B – Uncertainty & Report Limitations	24
Appendix C – Measured Baseline Noise Survey Data.....	30
Appendix D – Site Photographs.....	32
Appendix E – Site Layout Plans.....	36

1. INTRODUCTION

MZA Acoustics has been appointed by Mrs P Turner, to undertake a baseline noise survey and noise mitigation design in relation to the discharge of a planning condition of the planning approval issued for the redevelopment of the former Stable site in Hinchliffe Mill.

Planning approval was granted by Kirklees Council under Application Number 2021/62/91568/W subject to conditions. The condition imposed in relation to noise is Condition #10.

MZA Acoustics have been appointed to undertake the noise impact assessment in accordance with this condition. The following report details the baseline noise survey, assessment of likely noise impact on the development of the Site in respect of the assessment criteria of Kirklees and referencing all relevant technical guidance, and recommendations for the mitigation of road traffic noise.

1.1 Consultation

Direct consultation with Environmental Protection has not been deemed necessary as the methodology and procedures outlined in the document 'West Yorkshire Planning Consultation Guidance (Condensed version) – Noise & Vibration' dated May 2016 has been followed. This document was issued jointly by the West Yorkshire Local Authorities, including Kirklees Council.

1.2 Scope

The following scope of works is therefore considered within this report:

- A noise measurement survey undertaken at the premises to capture the road traffic noise levels incident at the Site.
- Preparation of a noise impact assessment based upon sound criteria set by Kirklees Council, and, where appropriate recommendations for mitigation measures to protect the future occupiers of the approved dwelling from unacceptable levels of road traffic noise.

This report occasionally employs technical terminology. In order to assist the reader, a glossary of terms is presented in **Appendix A**.

2. SITE DESCRIPTION

2.1 Site Location & Environment

The Site is located in a rural setting circa 1.65km to the southwest of Holmfirth town centre, within the Holme Valley in the south of Kirklees Metropolitan District.

The approved development Site is indicated approximately in **Figure 1** below by the yellow dot, and in more detail in **Figure 2**.

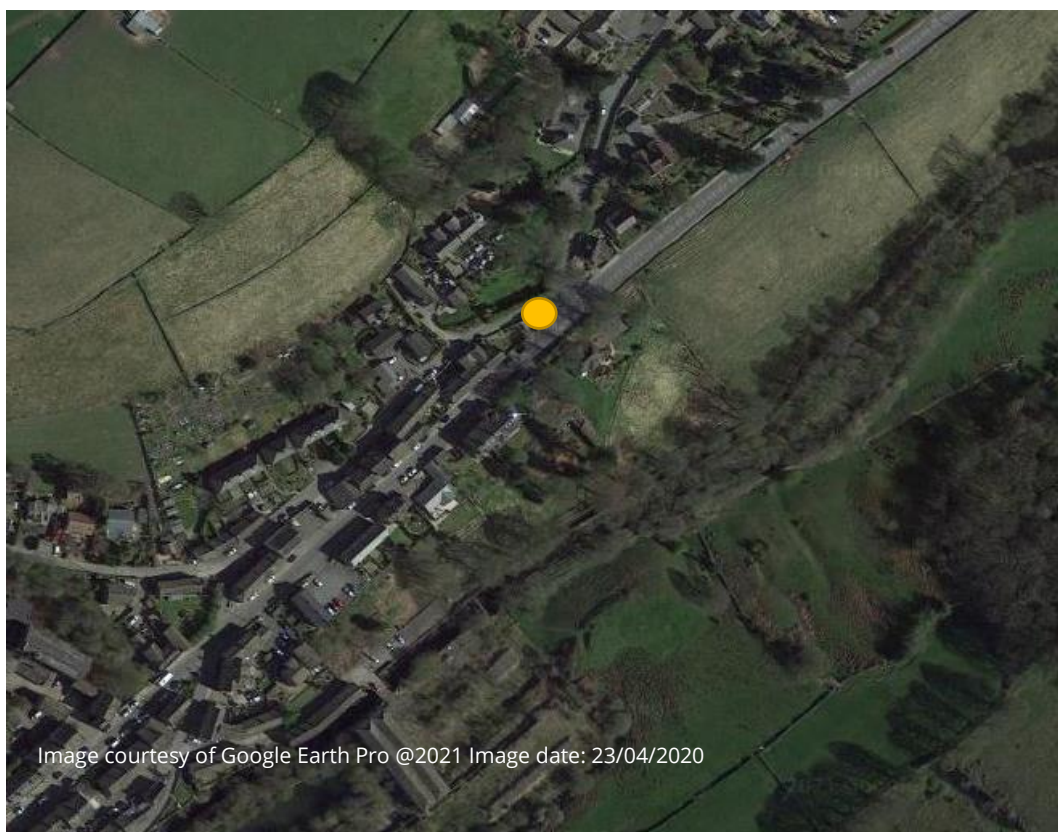


Figure 1 – General Site Location

The key environmental noise source in the vicinity of the Site is road traffic noise predominantly from Woodhead Road to the immediate southern boundary of the Site, and to a lesser extent Fairfield Road and Shaw Lane which form a 3-way junction at the eastern extent of the Site.

Further sound of note during lulls in road traffic are from wildlife (birdsong etc) and typical residential community noise including pedestrians.

The key concern is noise emissions from road traffic noise affecting the future occupiers of the approved dwelling.

The Site development (red line) boundary is shown in **Figure 2**.

3. **PLANNING POLICY GUIDANCE**

3.1 **Introduction**

Within the following section of the report, detail is presented relating to the relevant national and local planning policies and guidance applicable to the proposed development.

3.2 **National Planning Policy Framework (NPPF) July 2021**

The NPPF determines the government's planning policy for England. The document was first published in March 2012 with the most recent update in July 2021 which sets out how these policies are to be applied.

Section 15 'Conserving and enhancing the natural environment' states that Planning policies and decision should contribute to and enhance the natural and local environment by:

"...e) preventing new and existing development from contributing to, being put at risk from or being adversely affected by unacceptable levels of soil, air, water or **noise** pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans..."

Paragraph 185 continues:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so, they should:

- a) Mitigate and reduce to a minimum potential adverse impacts resulting from **noise** from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) Identify and protect tranquil areas which have remained relatively undisturbed by **noise** and are prized for their recreational and amenity value for this reason; and
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

The guidance contained within the NPPF further determines that consideration should be given to the Noise Policy Statement for England (DEFRA, March 2010).

3.3 Noise Policy Statement for England (NPSE, March 2010)

The NPSE attends to three types of noise;

- “Environmental noise” which includes noise from transportation sources;
- “Neighbour noise” which includes noise from inside and outside people’s homes; and
- “Neighbourhood noise”, which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

In line with the aims determined in the NPPF, the NPSE determines three aims;

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development;
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; and,
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The guidance detailed within the NPSE relates a number of key phrases with regards to adverse effects which can be applied to noise impacts as used by the World Health Organisation.

- **NOEL – No Observed Effect Level** - The level below which no health effect or detrimental impact on the quality of life is observed.
- **LOAEL – Lowest Observed Adverse Effect Level** - The level at which adverse effects on health and quality of life can be detected
- **SOAEL – Significant Observed Adverse Effect Level** - The level above which significant adverse effects on health and quality of life occur.

The guidance indicates that it is not possible to have a single objective noise-based measure that defines SOAEL, and as such the SOAEL is likely to be different for different noise sources and receptors. The document indicates that further research is required to establish what may constitute a significant adverse impact on health and quality of life from noise.

While the NPSE determines the NOEL, LOAEL and SOAEL descriptions, the document indicates that, unlike other environmental disciplines, there are currently no European or national noise limits which have to be met although the NPSE states that “there can be specific local limits for specific developments” allowing for negotiation.

3.4 Planning Practice Guidance - Noise

The Planning Practice Guidance for noise (published in March 2014 and updated July 2019) broadly considers the same issues as demonstrated within both the NPPF and the NPSE with regards to noise within the planning realm.

The information detailed within the PPG indicates that noise should be considered when:

- New developments may create additional noise; and/ or,
- New developments would be sensitive to the prevailing acoustic environment.

The guidance indicates that Local Planning Authorities should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and,
- Whether or not a good standard of amenity can be achieved.

The impact of noise is rated within the policy document in terms of the relative 'Observed Effect Level', defined in line with the guidance within the NPSE. Based upon this, the Planning Practice Guidance provides the following matrix of likely average response:

Perception	Example of Outcomes	Increasing Effect Level	Action
Lowest Observed Adverse Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/ or attitude, e.g. avoiding certain activities during periods of intrusion: where there is no alternative	Significant Observed Adverse Effect	Avoid

Perception	Example of Outcomes	Increasing Effect Level	Action
	ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.		
Noticeable and very disruptive	Extensive and regular changes in behaviour and/ or an ability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 1 - PPG Observed Effect Levels

3.5 **West Yorkshire Planning Consultation Guidance (condensed Version) – Noise & Vibration” - May 2016**

Kirklees is one of five Local Planning Authorities in the West Yorkshire Area to contribute to the planning consultation document which clearly sets out the objectives for developers both in terms of existing and proposed noise sensitive receptors. This resolves the need to undertake direct consultation in the majority of cases, as the guidance for representative planning situations is clearly described.

For developments containing noise sensitive users where the noise source is classed as an anonymous noise source (i.e. transportation noise), applicants are required to demonstrate that the following criteria presented as **Figure 5** can be achieved:

4.1 Anonymous Noise Sources: General Environmental Noise - Transportation Noise			
<i>Table 1: Recommended Maximum, LOAEL sound levels based upon an Absolute criterion.</i>			
Location	Time Period	Ambient Level (dB L_{Aeq,T})	Maximum noise level (dB L_{AFmax})
		LOAEL	LOAEL
External amenity areas	0700-2300	55	-
External amenity areas	2300-0700	45	60
Habitable room	0700-2300	35	-
Bedroom	2300-0700	30	45
Dining Room	0700-2300	40	-

Figure 5 - West Yorkshire residential design criteria

These levels accord with the internal design criteria of British Standard 5228:2014.

3.6 **BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’**

This Standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

The guidance provided includes appropriate internal and external noise level criteria, which are applicable to dwellings exposed to steady external noise sources. It is stated that it is desirable for internal ambient noise levels not to exceed the criteria set out in **Table 2** below.

Activity	Location	Period	
		07:00 to 23:00 (Daytime)	23:00 to 07:00 (Night-time)
Resting	Living Room	35 dB $L_{Aeq,16h}$	
Dining	Dining Room/area	40 dB $L_{Aeq,16h}$	
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

Table 2 - Summary of Internal noise level criteria for habitable rooms from BS 8233:2014

With regards to individual noise events, BS 8233 states that:

'A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values'.

The superseded version of the standard (1999 version) suggested a night-time level of 45dB $L_{Amax, fast}$ which should not 'normally' be exceeded, which concurs with current World Health Organisation guidelines. As such, this level will be considered in the subsequent assessments of noise impact during the night for the typically highest occurring $L_{Amax, fast}$ noise events.

It is recognised within the standard that where development is desirable 'these criteria may be relaxed by up to 5dB and reasonable internal conditions still achieved'.

With respect to external amenity space such as gardens and patios, it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,16h}$, with an upper guideline value of 55 dB $L_{Aeq,16h}$, which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances, such as within city centres, urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

3.7 **BS 7445-2:1991 'Description and Measurement of Environmental Noise'**

BS 7445-2:1991 '*Description and Measurement of Environmental Noise - Part 2: Guide to the acquisition of data pertinent to land use*' defines parameters, procedures and instrumentation required for noise measurement and analysis. Accordingly, together with associated guidance within the documents below, this Standard has been used to ensure the survey and data are fit for purpose.

4. PLANNING CONDITIONS

The planning condition relevant to this Report are provided below.

10. Before construction work commences a report specifying the measures to be taken to protect the development from road traffic noise from Woodhead Road and Fairfields Road shall be submitted to and approved in writing by the Local Planning Authority. The report shall:

- a) Determine the existing noise climate
- b) Predict the noise climate in gardens/ outdoor seating areas (daytime), bedrooms (night-time) and other habitable rooms of the development
- c) Detail the proposed attenuation/design necessary to protect the amenity of the occupants of the new residences (including ventilation if required).

The development shall not be occupied until all works specified in the approved report have been carried out in full and such works shall be thereafter retained.

Reason: To ensure that future occupants are not subjected to unacceptable levels of noise disturbance arising from traffic noise, and to accord with the aims of Policies LP24(b) and LP52 of the Kirklees Local Plan and Chapter 15 of the National Planning Policy Framework. This is a pre-commencement condition to ensure that satisfactory noise attenuation measures, where required, can be incorporated into the development during the construction process.

5. ENVIRONMENTAL NOISE SURVEY

5.1 Overview

A noise survey has been undertaken by MZA to measure the background noise levels incident at the Site boundary. The measurement location was established and attended in part by Graham Hornby, a full Member of the Institute of Acoustics.

The noise measurement commenced at 12:12 hours on 2nd November 2021 and continued until 14:30 on 3rd November 2021.

5.2 Noise measurement Equipment

Noise measurements were undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3**.

Item	Make & Model	Serial Number	Calibration Due Date
Sound Level Meter	Bruel & Kjaer 2250	3001434	21/04/2023
Pre-amplifier	Bruel & Kjaer ZC0032	14720	
Microphone	Bruel & Kjaer 4950	2827236	
Calibrator	01dB Metravib CAL31	87801	21/04/2022

Table 3 - Details of Sound Measurement Equipment

The sound level meter, pre-amplifier and microphone was calibrated to traceable standards within the 24 months prior to the measurements. The portable calibrator used was calibrated within the 12 months preceding the date of the survey.

All equipment was field calibrated before and after the measurement survey and no significant drift was noted.

5.3 Weather Conditions

The weather conditions during the survey period were largely dry, sunny and calm, with a typical daytime air temperature of 10°C with a very slight breeze, less than 1m/s (observed at 0.9m/s). A brief, light rain shower was noted at around 4pm on 2nd November which was enough to dampen the road surface for up to 1 hour. There was a further heavier rain shower noted to begin at 5:15am. The road surface was still damp at 8am but quickly dried with increased passing traffic. Night time temperatures remained above freezing and no further rain was noted during the survey.

5.4 Noise Measurement Location

Due to the compact nature of the Site a single, unattended measurement position was deemed sufficient to quantify the noise incident from all passing road traffic on Woodhead Road, and Fairfield Road, as required in the Planning condition.

The microphone was installed on a tripod circa 1.2m above ground level in the existing garden area associated with 84 Woodhead Road, at the approximate façade location of the first floor kitchen overlooking Woodhead Road, as indicated on the floor and elevation plan in **Figure 6** below. Photographs of the measurement position and environs are presented in **Appendix D**.

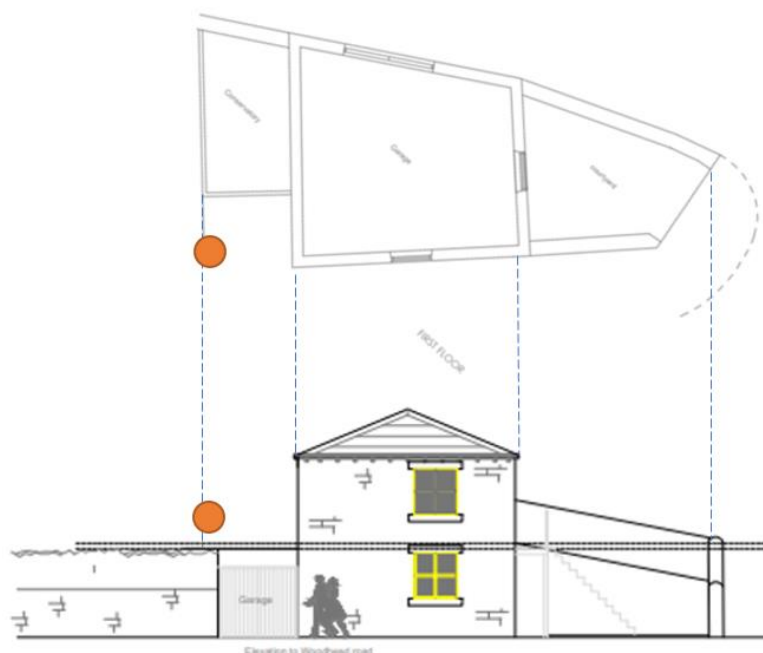


Figure 6 - Noise Measurement Position

5.5 Measurement Results

A summary of average measured sound pressure levels at the southern site boundary are presented in **Table 4** below.

Summary Period	Start Time	End Time	Measurement Period (T) DD:HH:MM	Average Measured Sound Levels, dB	
				L _{Aeq,T}	L _{AFmax}
Full measurement	12:13 (02/11/21)	14:30 (03/11/21)	01:02:17	64.2	89.9
Daytime ¹	07:00	23:00	00:16:00	65.4	-
Night time	23:00	07:00	00:08:00	57.5	80.4 (88.7) ²
¹ Aggregated daytime data					
² 10 th highest L _{AFmax} value presented with the absolute highest value measured in brackets.					

Table 4 - Summary of Measured Sound Levels

5.6 Data Analysis

During set up and removal of measurement equipment, the key noise source in the area was the virtually continuous road traffic noise on Woodhead Road. At night time, it is known that the road traffic becomes increasingly sporadic with an otherwise low background sound level expected in this rural location.

However, analysis of the measured data indicates that the night time noise level is maintained at an unusually elevated and steady level which is unusual.

A brief return visit to the Site confirms that the 'floor' of the measurement is controlled by the continuous operation of a fan within the nearby BT Openreach exchange box illustrated below.



Figure 7 - BT Openreach Exchange Unit adjacent boundary wall

This effect is seen as the distinct flattening of the L_{Aeq} and L_{AFmax} levels between 22:30 and 05:00, when road traffic is typically very low and no longer dominates the noise climate.

The full time-history of measured sound levels are presented in **Appendix C**.

Whilst the noise from the exchange is noticeable close to the unit, at the measurement position it is only noticeable during periods of quiet in the middle of the night. As such the effects are unlikely to be heard within the formal outside spaces of the approved development, which are found on the opposite side of the existing building. The detailed noise impact assessment is presented in the following section.

6. NOISE IMPACT ASSESSMENT

6.1 Overview

This section presents the details and results of the noise impact assessment to assess compliance with the design criteria required by Kirklees Council, as detailed in Section 3.5 of this report.

6.2 Impact Assessment

On the basis of the measured environmental sound levels being representative of typical daytime and night time sound incident at the development, resulting from (principally) the road traffic on Woodhead Road, and to a lesser extent, Fairfields Road. The likely external and internal noise levels at the development can be calculated for the daytime and night time periods.

The summary results of the assessment are presented in **Table 5** below and for internal elements assume a partially open window for ventilation¹, with predicted internal levels with a closed standard thermal double glazed unit in brackets².

Assessment Location	Target criteria, dB	Predicted Sound Level, dB	
		07:00 to 23:00 (Daytime)	23:00 to 07:00 (Night-time)
External Elements			
Ground Floor Patio daytime	55 LAeq,16h	65 LAeq,16h	-
Ground Floor Patio night time	45 LAeq,8h	-	58 LAeq,8h
First Floor Balcony daytime	55 LAeq,16h	65 LAeq,16h	-
First Floor Balcony night time	45 LAeq,8h	-	58 LAeq,8h
External Maximum night time sound level	60 LAFmax	-	80 LAFmax
Internal Elements			
Living Room daytime	35 dB LAeq,16h	50 (32) dB LAeq,16h	-
Dining Room/area daytime	40 dB LAeq,16h	50 (32) dB LAeq,16h	-
Bedroom daytime	35 dB LAeq,16h	50 (32) dB LAeq,16h	-
Bedroom night time	30 dB LAeq,8h	-	43 (25) dB LAeq,8h

Table 5 - Summary of noise impact assessment

The outcomes of the assessment presented in Table 7 indicate that noise levels on the whole exceed the LOAEL threshold in all cases (indicated in **red**) with an open window. When windows are closed the LOAEL is achieved (indicated in **green**).

¹ Assuming a reduction for a partially open window of 15dB from Annex G.1 of BS8233:2014

² Assumed reduction for standard thermal double glazed units taken from PPG24 Annex 6 Table 1.

Mitigation measures should therefore be considered by the developer to protect the amenity of the future sensitive receptor(s) and to implement suitable measures at the construction phase of the development. The following section identifies the recommended noise mitigation.

6.3 Mitigation

The external sound level measured is obtained with full exposure to the passing road traffic. The impact assessment for external amenity areas in **Table 7** does not allow for any sound mitigation offered by the existing boundary structure.

The ground floor patio/courtyard is enclosed by a retaining wall at circa 1.55m high along Woodhead Road, and circa 1.0m high on Fairfield Road, from the base on the road side. These elements would be expected to give some acoustic screening from the road traffic on Woodhead Road to the external amenity area, however the current gated access to the yard is open iron work with no acoustic properties. It is considered raising the walls further is undesirable from a planning or occupant perspective.

It is recommended that to reduce the sound level of the patio courtyard, the access gate indicated in the site plans should be of solid construction (e.g. timber) with a surface density of 12kg/m^3 . The gate should be at least 1.6m high (to match the adjacent wall) and constructed such that no air gaps are present at the base of side margins (e.g. use of suitable rebates on frames or similar), and where necessary, acoustic seals from durable rubber should be integral at the base of the gate. As this is not the principal entrance to the property, it is likely that the use of the gate would be minimal and such a detail would therefore be feasible, whilst retaining a sympathetic aesthetic to the front elevation.

It is likely that the effective acoustic enclosure of the ground floor patio courtyard would reduce sound levels within the LOAEL criteria of $55\text{dB } L_{\text{Aeq},16\text{hr}}$.

6.4 Internal noise impact

The free-field measured data presented in **Table 5** provides an indication of the likely exceedances within the premises, particularly due to an open window at the developed property.

In order to calculate the effects of the road traffic within the proposed habitable rooms, the simple method presented in BS8233:2014 Annex G1 has been applied. The method determines the required sound reduction of the window and any trickle vents by a straight calculation of the external free-field noise level minus the internal noise criterion.

As BS8233 states this method can underestimate noise levels by up to 5dBA, a 5dB penalty has been applied to the criteria in the following calculations and the subsequent glazing specification summarised in **Table 6** below.

Glazing Location	Target criteria, dB	Glazing requirement by room type	
		07:00 to 23:00 (Daytime)	23:00 to 07:00 (Night-time)
Living Room daytime	35 dB L _{Aeq,16h}	35 R _w (6/12/8)	-
Dining Room/area daytime	40 dB L _{Aeq,16h}	30 R _w (6/12/6)	-
Bedroom daytime	35 dB L _{Aeq,16h}	35 R _w	-
Bedroom night time	30 dB L _{Aeq,8h}	-	33 R _w
	45 dB L _{AFmax, T}	-	40 R _w (6/16/6.4)

Table 6 - Recommended Glazing Specifications

It is already established in **Table 4**, that due to the proximity to high road traffic levels, windows of habitable (sensitive rooms) will need to remain closed in order to achieve the design criteria requires by Kirklees Council. It should be noted that windows of the type specified above will remain openable to provide the future occupier with choice, and to also allow fast purge ventilation of the habitable spaces e.g. of cooking odours or paint fumes. However, in order to meet the criteria, the windows must remain closed and therefore an alternative means of background ventilation should also be provided.

Given the above it is recommended that acoustic trickle vents be provided capable of the acoustic ratings specified in **Table 7**. Alternatively, a ducted supply and extract system (e.g. MVHR) could be used (ideally with external connections located on quitter facades).

Glazing Location	Target criteria, dB	Ventilator requirement by room type	
		07:00 to 23:00 (Daytime)	23:00 to 07:00 (Night-time)
Living Room daytime	35 dB L _{Aeq,16h}	38 D _{new} (TA5223+TA5005)	-
Dining Room/area daytime	40 dB L _{Aeq,16h}	33 D _{new} (TA5220 + TA5202)	-
Bedroom daytime	35 dB L _{Aeq,16h}	38 D _{new}	-
Bedroom night time	30 dB L _{Aeq,8h}	-	36 D _{new}
	45 L _{AFmax, T}		43 D _{new} (TA5225 + TA5206)

Table 7 - Recommended Trickle Ventilator Specifications

The above are based on there being one acoustic trickle ventilator per room (with a equivalent area of 2500mm²). If two are required the required performance shall be increased by 3dB.

Example product codes relate to the Titon® SF Xtra Sound Attenuator (Acoustic) Vent range³, but equal performing alternatives can also be used.

³ [Acoustic Trickle Vents - Sound Attenuating ventilators \(titon.com\)](https://www.titon.com/)

7. CONCLUSIONS

7.1 Summary of findings

MZA Acoustics has been appointed by Mrs P Turner to undertake a noise impact assessment in relation to the discharge of planning condition number 10 of the planning approval issued for the redevelopment of the former stables and garage at 84 Woodhead Road, Hinchliffe Mill, Holmfirth.

Planning approval was granted by Kirklees Council under Application Number 2021/62/91568/W subject to conditions. The condition imposed in relation to noise is Condition #10.

MZA Acoustics have undertaken a baseline noise survey and subsequent noise impact assessment in accordance with this condition.

A site visit has been undertaken to measure noise levels at the Site boundary with regard to the road traffic noise on Woodhead Road (and to a lesser extent on Fairfield Road).

An assessment in accordance with the criteria typically imposed by Kirklees Council has found that the internal sound criteria can be achieved in sensitive rooms across the development, with the application of a suitable glazing and ventilation scheme.

External sound criteria are likely to be achieved in part of the Site, with some relaxation of the typical criteria imposed by Kirklees required at the balcony level.

The acoustic recommendations for glazing and ventilation should be checked by the architect to confirm building regulation requirements are met. MZA Acoustics are not responsible for implementation of the recommendations presented in Section 6 of this report.

APPENDICES

Appendix A – Glossary of Acoustic Terminology

Acoustics and Noise

Acoustics is the branch of physics concerned with the properties of sound, including ultrasound, infrasound and vibration. A scientist or engineer who works in the field of acoustics is an acoustician or acoustic engineer.

Sound can be measured by a sound level meter or other measuring system. Noise is related to a human response, and is routinely described as unwanted sound, or sound that is considered undesirable or disruptive.⁴ Care has been taken in this document to use the most relevant of these terms (whereby 'sound' is used predominantly); however, in most reference documents, and, indeed, generally, 'sound' and 'noise' are used interchangeably. Consequently, just because the term 'noise' is used doesn't necessarily mean a negative effect exists or will occur, and the context of the accompanying text should be taken into account.

Human hearing is able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble), and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain).

The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify sound in a manner that approximates the response of the human ear, a weighting mechanism is used, which reduces the importance of lower and higher frequencies in a similar manner to human hearing.

The weighting mechanism that best corresponds to the response of the human ear (though not necessarily perfectly) is the 'A'-weighting scale. This is widely used for environmental sound measurement, and the levels are denoted as dBA, dB(A) or L_{Aeq} , L_{A90} etc. according to the metric being measured or determined (see the Definitions over leaf).

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. Where other changes occur (associated with the change in sound level), such as additional vehicle movements on a road, which can be seen, then these may result in changes in sound level being more noticeable than they might otherwise be.

Further to such visual clues, and any other non-acoustical factors that affect people's response (such personal characteristics, and social, residential or environmental factors), the subjective response to a sound is dependent not only upon the sound pressure level and component frequencies, but also its intermittency. Consequently, various metrics have been developed to try and correlate people's attitudes to different sounds with the sound level and its fluctuations. The metrics used in this document, as per the relevant guidance, are defined overleaf.

⁴ Taken from the Foreword to BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*.

Airborne Sound	Sound that reaches the point of interest by propagation through air.
Ambient Sound:	Sound from all sources at any given time, from both near and far. Usually measured in terms of L_{Aeq} .
A-Weighting	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Background Sound Level	The A-weighted sound pressure level that can be considered the baseline in the absence of any noise from a specific source of sound under assessment. Measured in terms of $L_{A90, T}$.
Calibration	The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short-term measurements, and periodically for longer term monitoring.
Class 1	The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard IEC 60651 referred to the grade as "Type", whereas the new standard IEC 61672 refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however, MZA use Class 1 (or Type 1) meters by default, as required by BS 4142:2014, for example.
Decibel	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds (s_1 and s_2) is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 Pa.
Fast time Weighting (F)	Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 Electroacoustics. Sound level meters. Pattern evaluation tests.
Free-field / Façade	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
IoA	The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British Acoustical Society (a daughter society of the Institution of Mechanical Engineers). It is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels. MZA is a Sponsor Member of the Institute of Acoustics, and all our consultants/ engineers are individual Members.
$L_{AF90, T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T,

	measured using time fast time-weighting (F). Generally used to describe the 'background' sound conditions.
L_{AFmax}	The maximum A-weighted sound pressure level during a given time period. L _{max} is sometimes used for the assessment of occasional loud sounds, which may have little effect on the overall L _{eq} noise level but could still affect the sound environment. Unless described otherwise, it is measured using the fast time-weighting (F).
L_{eq, T}	A sound level index called the equivalent continuous sound level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded. Where the value is A-weighted, it will be presented 'L _{Aeq,T} ' or 'dBA L _{eq,T} ', otherwise it should be an un-weighted (or linear) value.
L_p	See Sound Pressure Level.
Noise	Related to human response to sound. Unwanted sound, or sound that is considered undesirable or disruptive.
Octave Band	Frequency ranges in which the upper limit of each band is twice the lower limit. Octave bands are identified by their geometric mean frequency, or centre frequency.
Line Source	An idealised way of modelling a sound source, consisting of a uniform, flat plane.
Point Source	An idealised way of modelling a sound source, consisting of an infinitesimally small point, radiating sound equally in all dimensions
Sound Level Metrics	Sound levels usually fluctuate over time, so it is often necessary to consider an average or statistical sound level. This can be done in several ways, so a number of different metrics have been defined, according to how the averaging or statistics are carried out.
Sound Power	In a specified frequency band, the rate at which acoustic energy is radiated from a source. In general, the rate of flow of sound energy, whether from a source, through an area, or into an absorber.
Sound Power Level	Of airborne sound, ten times the common logarithm of the ratio of the sound power under consideration of the standard reference power of 1 pW. Expressed in decibels.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20 Pa (20x10 ⁻⁶ Pascals) on a decibel scale.
Specific Sound	The sound source being assessed in a BS 4142:2014 assessment.
UKAS	United Kingdom Accreditation Service, recognised by government to assess organisations that provide certification, testing, inspection and calibration services against internationally agreed standards.

Appendix B – Uncertainty & Report Limitations

Uncertainty

Uncertainty is an unavoidable feature of measurements in the field, which can be subject to many factors; the weather typically being the most significant of which with respect to the measurement of sound. Uncertainty is also unavoidable in the prediction of sound levels, where naturally, before the scenario being considered becomes a reality, a number of assumptions need to be relied upon. There is also the uncertainty of people's reactions, which can be influenced by a number of factors, not just the magnitude or character of the sound in question.

In keeping with the scale of each project, therefore, it is the aim of MZA Acoustics to minimise uncertainty at each stage as far as reasonably practicable. With this in mind, and where it is within the control of MZA Acoustics, the control measures listed in the following table are followed, which have been derived from the guidance within BS 4142:2014 and the experience of MZA Acoustics.

Crucially, it has been determined that environmental noise measurements have been undertaken by suitably qualified staff, using in calibration equipment, in a number of locations, over a period of at least 24 hours, and avoiding adverse weather conditions.

The predictions have also been undertaken by suitably qualified staff, whilst using the best available information, an industry standard calculation method, and the most applicable calculation procedures.

Notwithstanding this, naturally some uncertainty remains. Given the sheer number of factors involved, however, it is not feasible to place a value on the level of uncertainty, without resulting in an unhelpful range of possible outcomes. It is the professional position of MZA Acoustics that uncertainty has been kept to a realistic minimum and that the outcome of this assessment is sufficiently representative.

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Measurement		
Only use in calibration Type/Class 1 equipment and check (and record) calibration level before and after measurements	✓	Yes
Measurements were taken using the time and frequency weighting specified by the relevant standard	✓	Yes
Detailed notes were made, including details of the equipment, weather, survey positions (including approximate distances), contributing noise sources, presence of screening etc.	✓	Yes
Take photographs, and record survey locations using GPS if possible	✓	Yes
Avoid standing waves/interference – listen for effects, take spatial average from several locations or conduct a sweep	×	N/A
Take measurements at different distances to establish propagation	×	N/A
Take measurements at different heights where relevant	×	N/A
Don't just measure at the “noisiest” parts of site, but establish how “quiet” it is, too, where relevant to the assessment	×	N/A
Measure under different operating conditions relevant to your assessment / adopt worst case if known	×	N/A
Measure more than one cycle/ event (ideally at least three)	×	N/A
Determine state of repair of any associated source, where relevant	×	N/A
Use a windshield and avoid windy conditions (i.e. gusts regularly exceeding 5 m/s)	✓	Yes
Avoid wet conditions (particularly in terms of rain on the windshield/mic and on neighbouring surfaces)	✓	Yes
Avoid electrical and electromagnetic interference (such as from power cables and radio transmitters)	✓	Yes
Avoid extreme temperatures – traffic conditions can be different in freezing conditions, whilst meters can overheat and fail in a case when in direct sunlight during the summer.	✓	Yes

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Make measurements during different weather conditions (particularly relevant in terms of wind direction for sites affected by aircraft movements, but also for sites affected by other distant, but significant, sources of noise, in different directions)	×	N/A
Where one source is dominant (such as a main road), as a minimum, measure during conditions favourable to propagation (i.e. when wind direction is within +/-45° of the line between the source and receiver or during temperature inversion, such as on clear calm nights)	×	N/A
Avoid tree/leaf (movement) sound where possible – ideally take measurements the same distance from sources of such sound as any receptors of interest	×	Unavoidable due to location, but minimal influence due to low windspeeds.
Avoid dawn chorus sound where possible – ideally take measurements the same distance from trees and bushes as any receptors of interest	×	N/A
Measure outside the receptor in question where possible; however, it is worst case typically to measure under free-field conditions and apply +3 dB correction to convert to “façade” where applicable – for most planning (new residential development) assessments, free-field is preferable	✓	Yes – closest boundary
Where it is not possible to install a meter outside the receptor in question, install a meter elsewhere and undertake additional attended measurements, either outside the receptor or at a representative location (when not adequately covered by the installed meter)	✓	N/A
Avoid atypical traffic conditions (such as during school holidays and road works – road traffic incidents can significantly affect flows, but which can't be predicted, and their occurrence can't always be established after the survey – check the data for anomalies)	✓	Yes
Avoid presence of you and/or the microphone resulting in atypical conditions (e.g. people stopping to talk, workers on site adjusting their way of working, etc.)	✓	Yes
Data Handling		
Download data immediately after survey and process promptly whilst details are fresh in your head	✓	Yes
Use digital transfer methods wherever possible, double check data read-off manually	✓	Yes

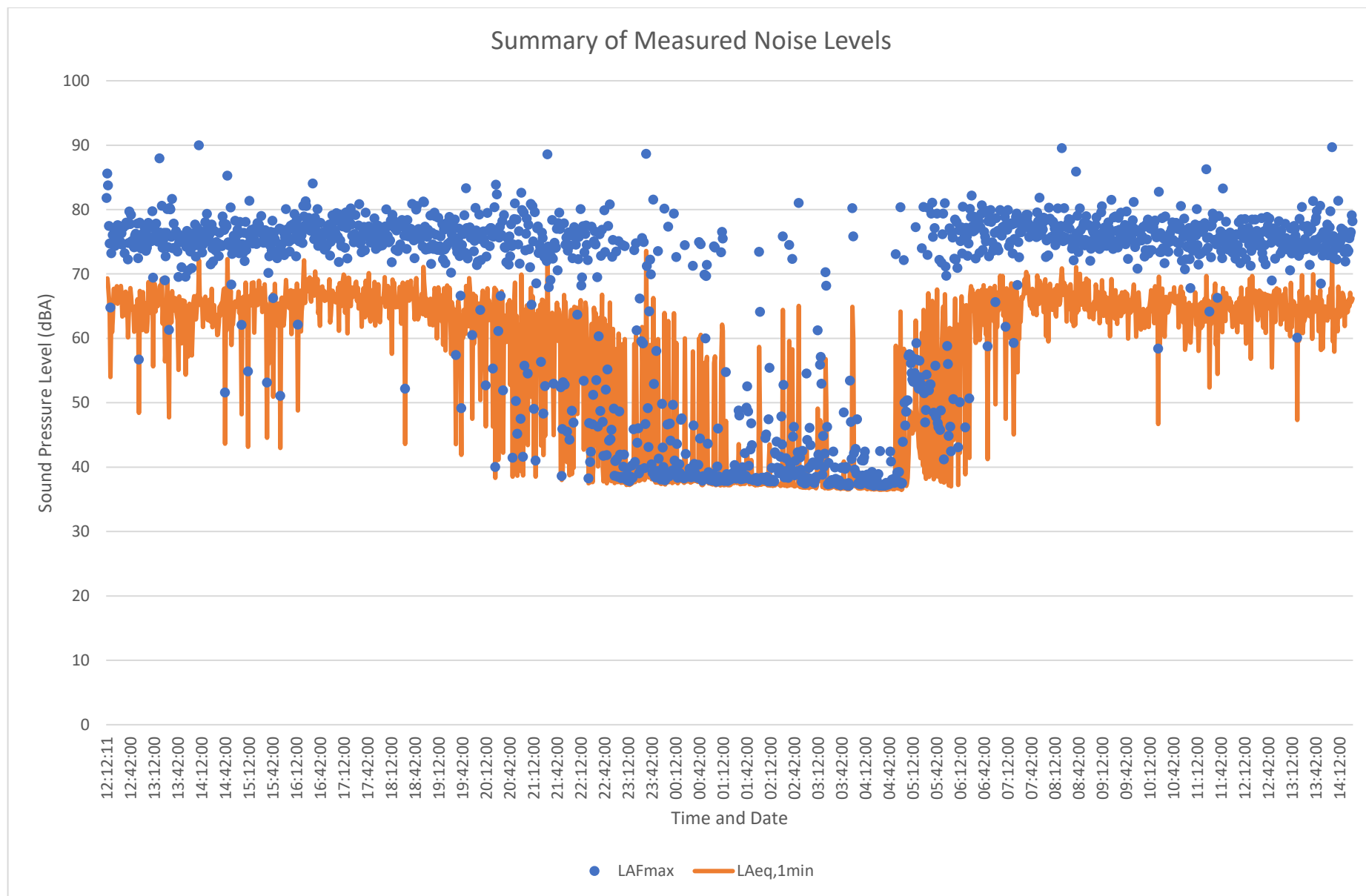
Uncertainty Control Measures	Applicable?	Adopted?/Comments
Look at the time-history (in as fine a resolution as possible) for any unexpected events – preferably with active spectral data (i.e. in dBTRAIT)	✓	Yes
If removing any data (due to an atypical event, for example), 'save as' a new file and provide a note to the data within the corresponding Excel file	✓	Yes
Prediction		
Use measurement data at different distances to verify propagation	×	N/A
Use measurements at different heights to verify screening effects, where relevant	×	N/A
Use propagation calculation procedure relevant to source and distance	×	N/A
Use detailed traffic flow data applicable to the assessment methodology	×	N/A
Use detailed sound source data (including octave-bands levels), accounting for size, height and directivity, where known	×	N/A
Use detailed topographical data and base mapping	×	Not modelled
Identify different ground types	×	Not modelled
Apply an order of reflections of at least one	×	Not modelled
Use 3D view feature of the modelling software to check the accuracy of the model	×	Not modelled
Produce contour plots as a further means of identifying any abnormalities or errors in the model	×	Not modelled

Report Limitations

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of MZA Acoustics Limited. MZA Acoustics Limited accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or MZA Acoustics Limited and agree to indemnify MZA Acoustics Limited for any and all loss or damage resulting therefrom. MZA Acoustics Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations MZA Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

Appendix C – Measured Baseline Noise Survey Data



Appendix D – Site Photographs



Existing stable access door off Woodhead Road

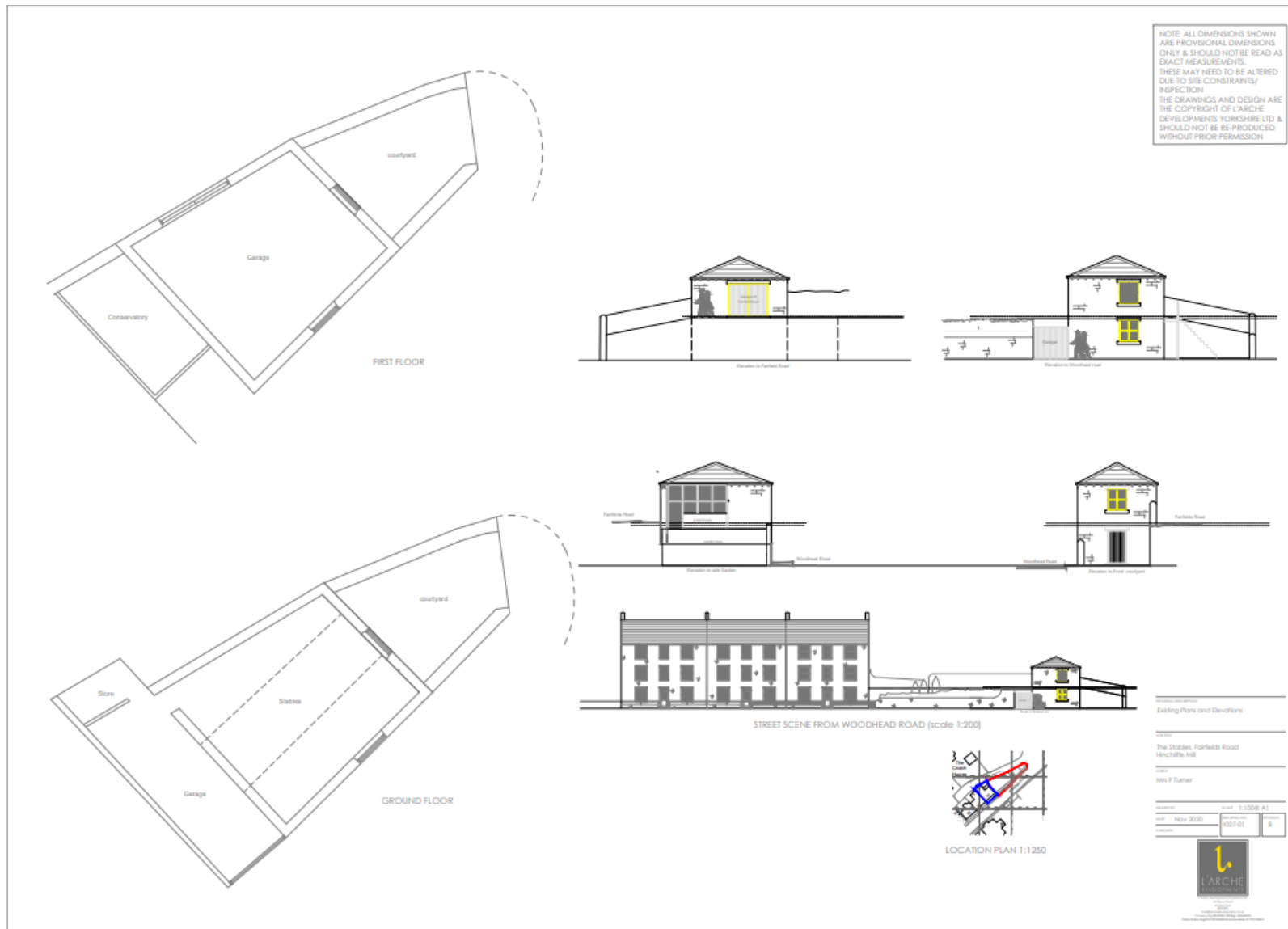


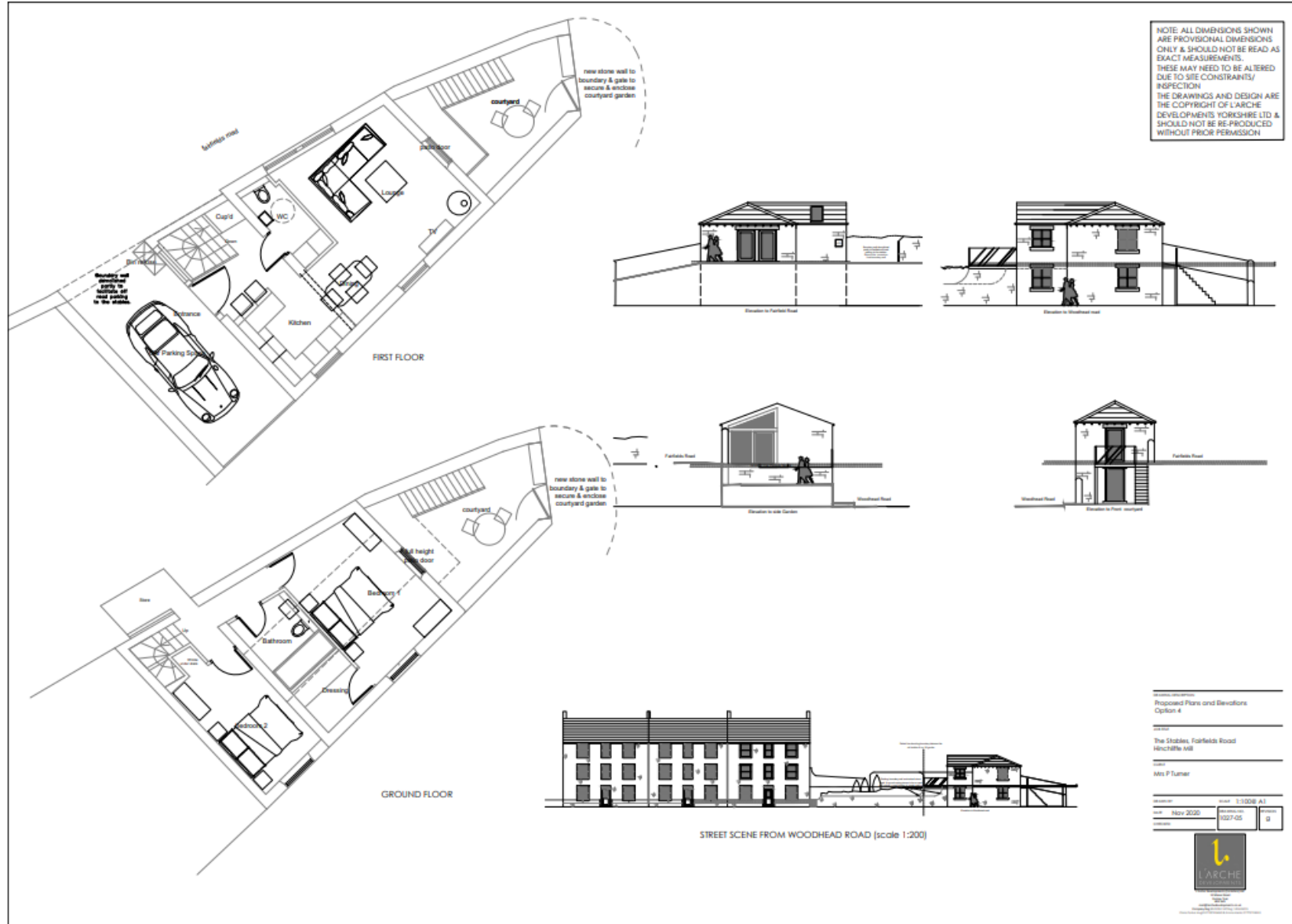
Noise measurement position at garden boundary with Woodhead Road



Noise measurement position overlooking Woodhead Road

Appendix E – Site Layout Plans





Page left purposefully blank



Platform, New Station Street,
Leeds, LS1 4JB

M: +44 (0)7769 676 097

T: +44 (0)113 426 9783

ahornby@mzaconsult.co.uk

www.mza-acoustics.co.uk